Fig. 1

Example IP Multicast System Arrangement

2000

| Data |

IP Data Packet

2002

| HE | Data | TE |

Encapsulation

2004

| HAL | HE | Data | TE | TAL |

ATM Adaption Layer

• • •

2006

| HA | | | HA | | | HA | | • • • ATM Cells

└─── 53 byte cells ───┘

Fig. 2

ATM Cell Overview

IP MULTICAST SIGNAL
(e.g., COOLCAST)

206

205

RCVR 204

203

INTERNET

R 201

200

R 301

ISP

IP MULTICAST SIGNAL 303

300

202

302

R 401

402

NSP

IP MULTICAST SIGNAL 403

500

D S L A M

501

...

502

400

M 602

605

M 503

R 604

IP MULTICAST SIGNAL 603

601

700

504

710
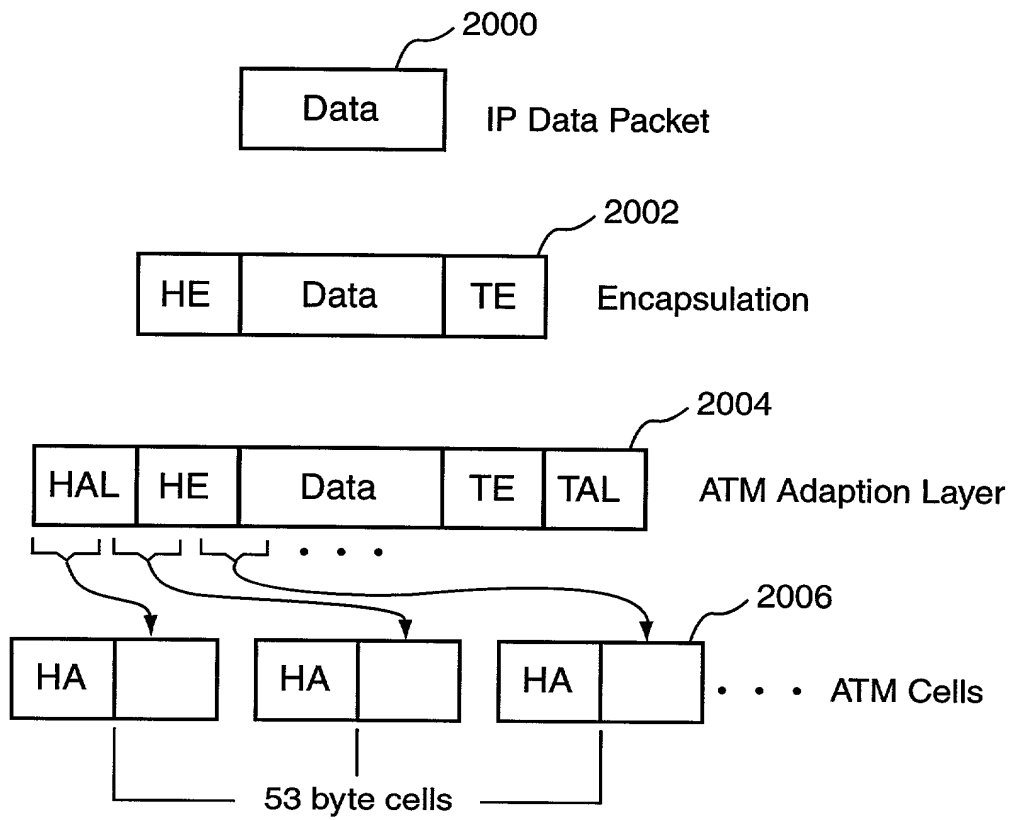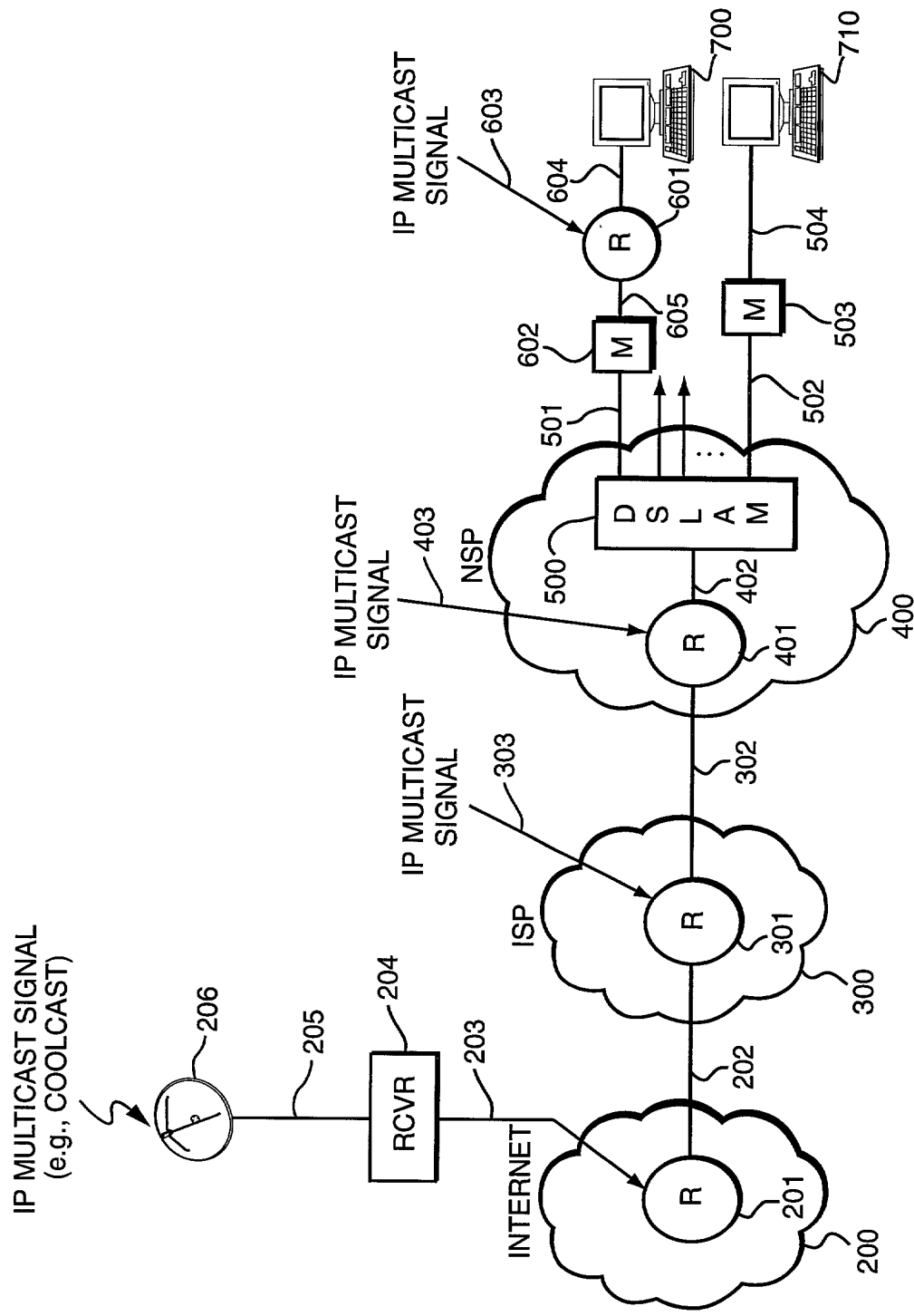
Fig. 3

Example Layer 3 Network Arrangement

Fig. 4(a)

MULTICAST SOURCE —IP→

1338

1336 — IAM

1340 ATM

1334

1332

1330 R

Internet 1368

ATM SWITCH

1342 VC1

VC2 ATM

1344 ⊕

CPE

802.3

1346

1348 Host

Fig. 4(b)

MULTICAST SOURCE —IP→

1354

1356 ⊕ AIMI

1352 ATM

1350 R

Internet 1366

1358 ATM

1360

CPE

802.3

1362

1364 Host
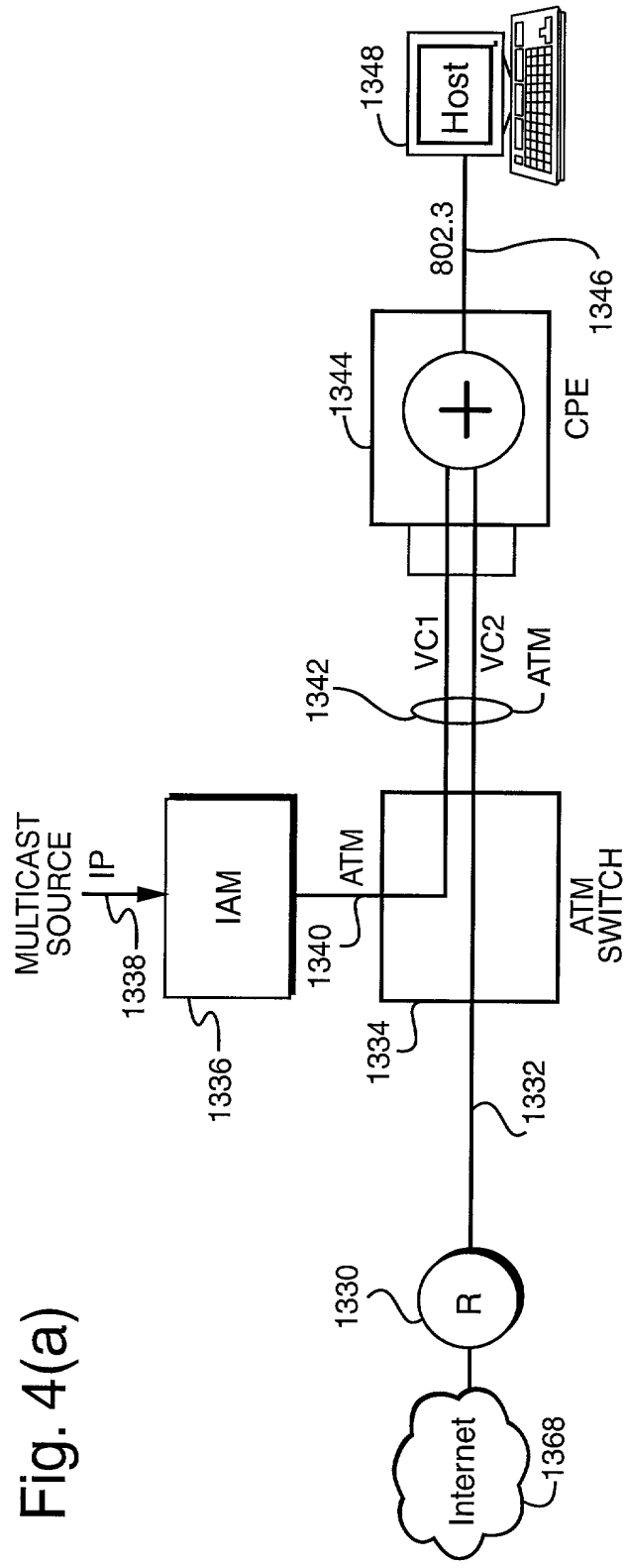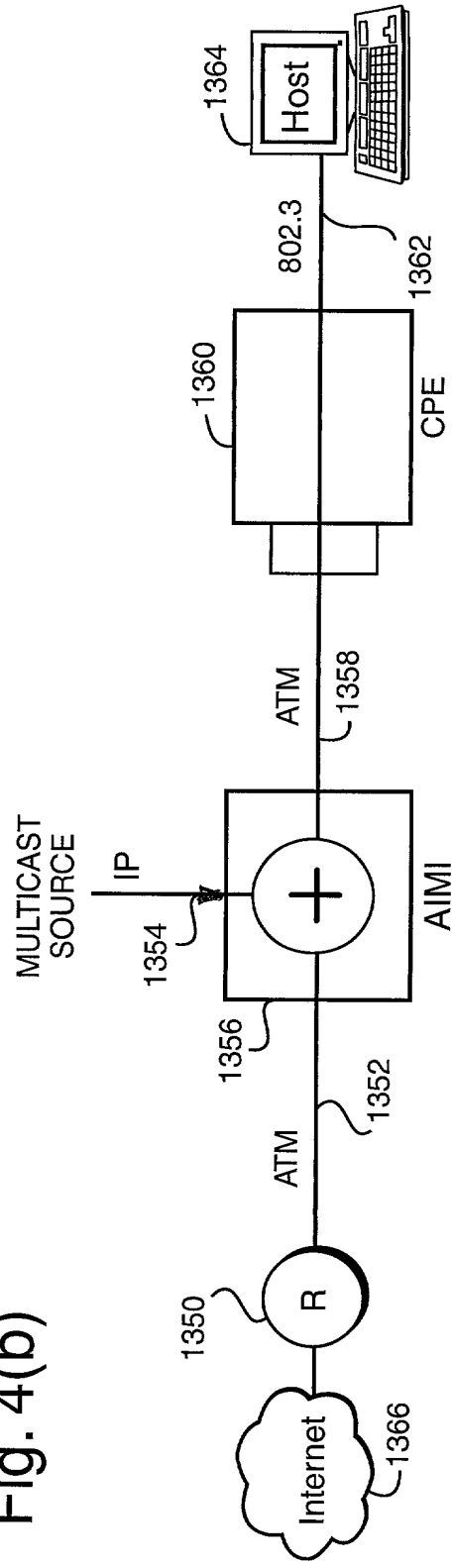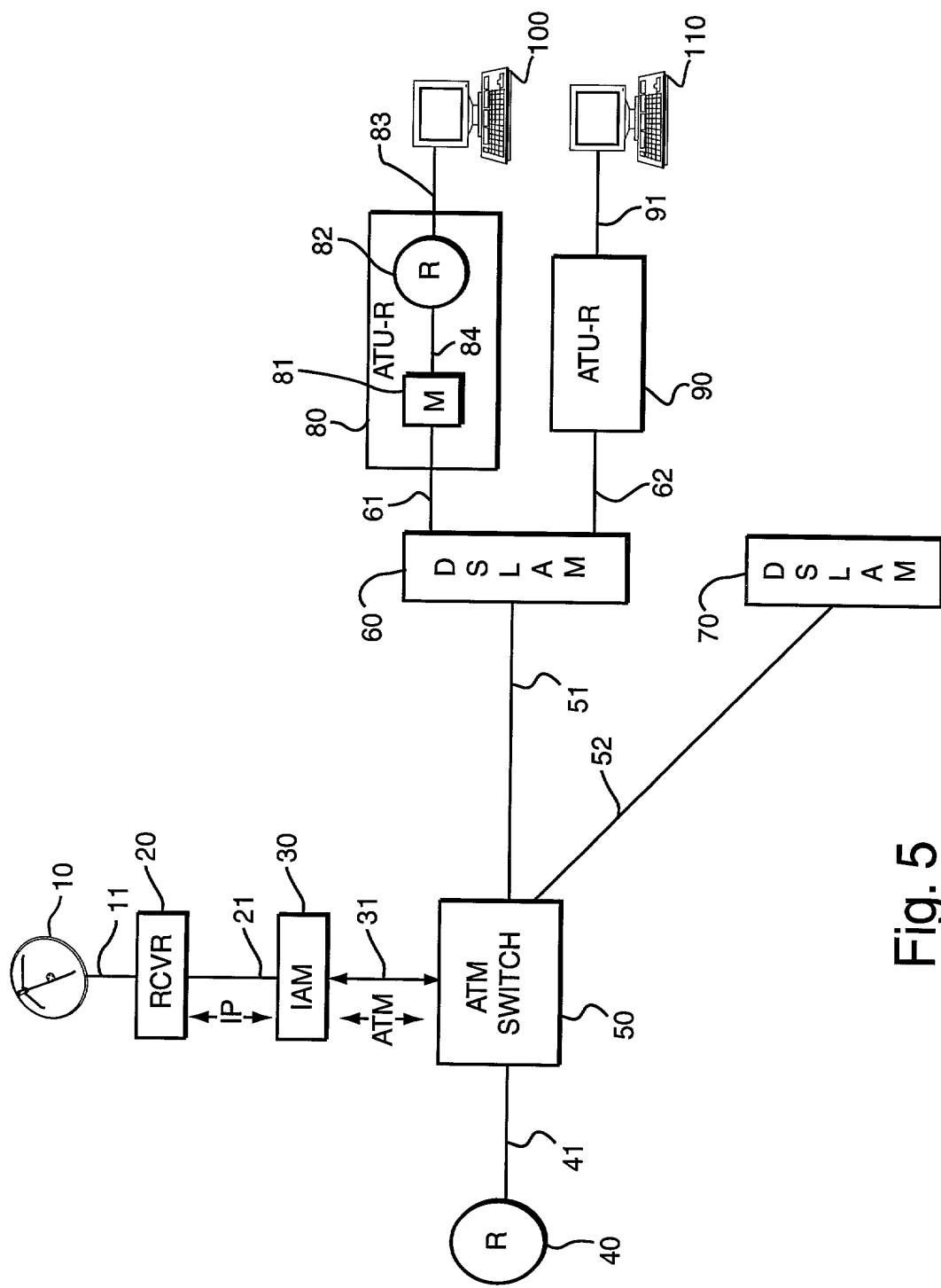
Fig. 5

Example Layer 2 Network Arrangement

IP MULTICAST PACKETS

$A_1A_2B_1C_1A_3B_2C_2B_3C_3\ldots$ 800

MONITOR & CONTROL 804

PACKET REPLICATION 802

1

$A_1A_2A_3\ldots$ 810

2

$A_1A_2A_3\ldots$ 812

3

$B_1B_2B_3\ldots$ 814

4

$C_1C_2C_3\ldots$ 816

E 820

E 822

E 824

E 826

830

850

832

852

834

854

836

856

• • •

IP PACKETS

ATM ADAPTION LAYER PROCESSING 840

1

2

3

4

$A_{11}A_{12}A_{21}A_{22}B_{13}C_{14}A_{31}A_{32}\ldots$ 842

LEAVE/JOIN REQUESTS

ATM CELLS

E { PACKET ENCAPSULATION }
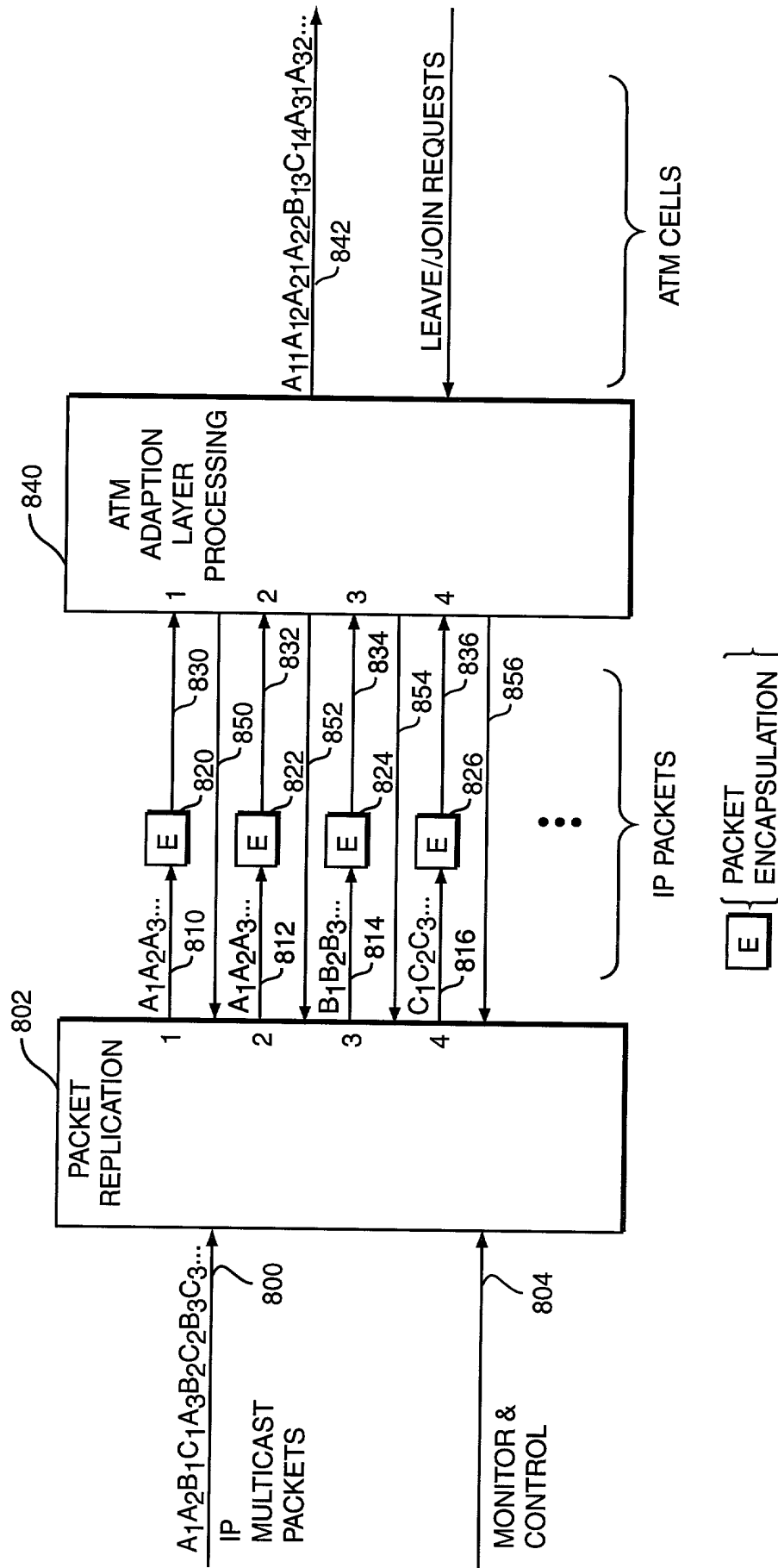
Fig. 6

Example IAM Processing
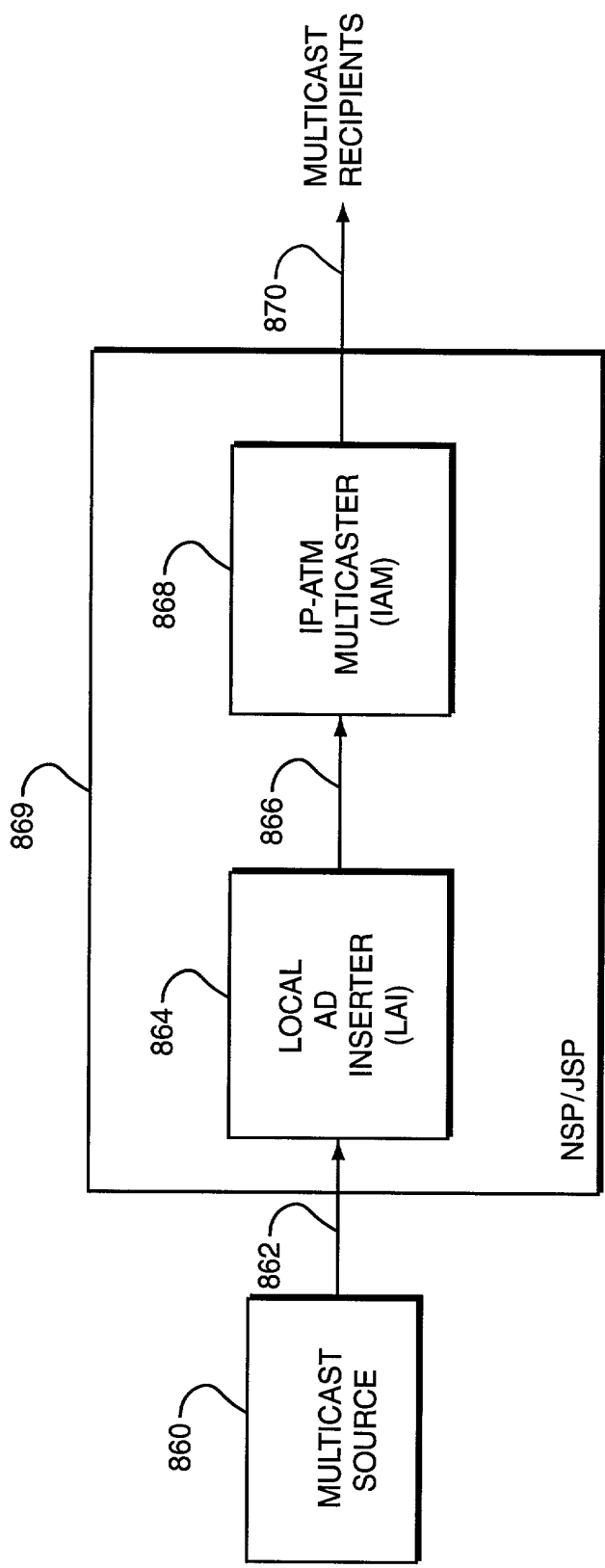
Fig. 7

Local Ad Insertion Example

TRAFFIC, BILLING, DISTRIBUTION 879

COMMUNICATION NETWORK 875

873

877

INPUT PACKETS
$A_1AT_2A_2B_1A_3B_2BT_3B_3A_4B_4$ 872

LOCAL AD INSERTER 874

OUTPUT PACKETS
$A_1AT_2A_2'B_1A_3B_2BT_3B_3'A_4B_4$ 876

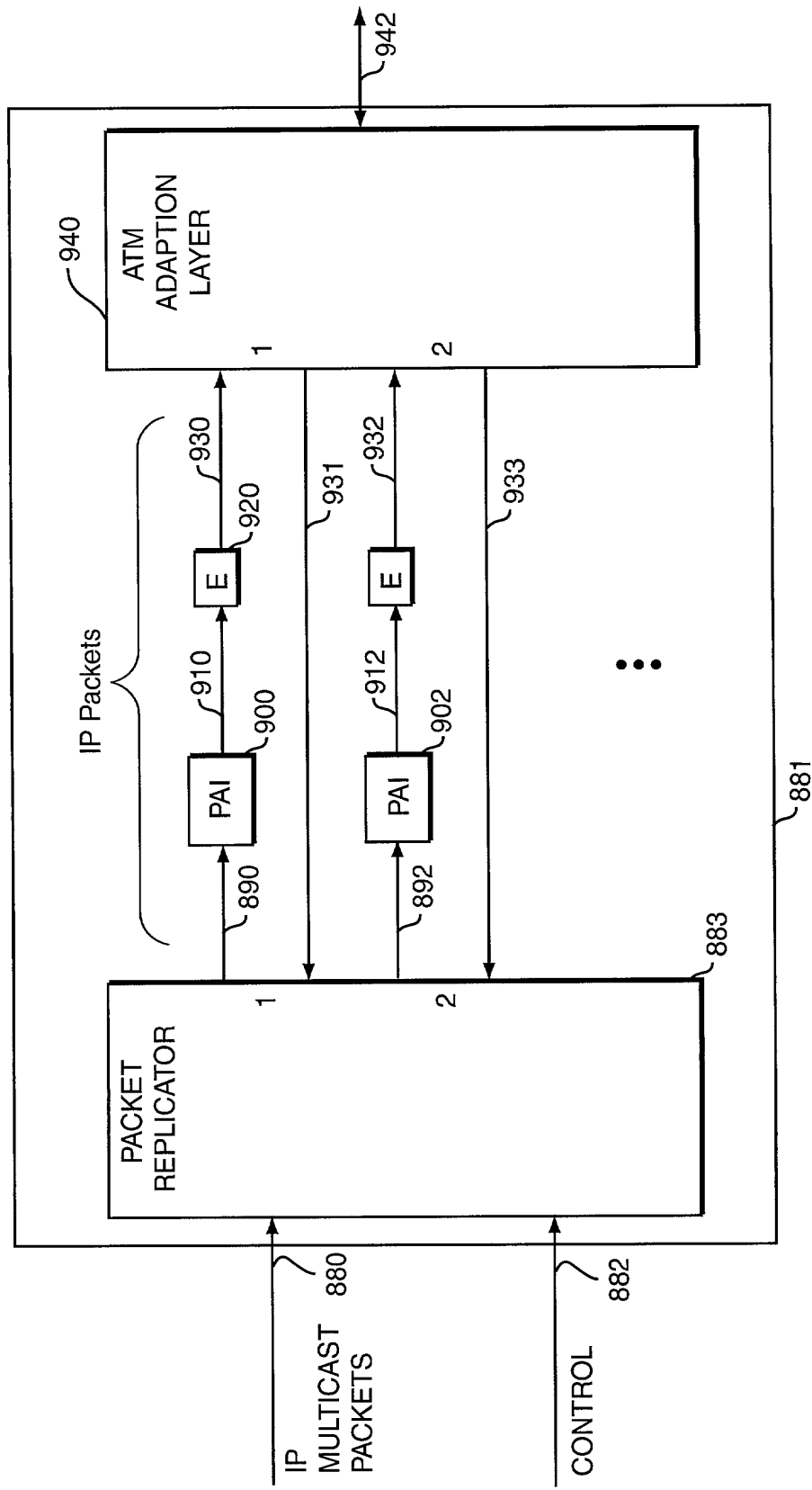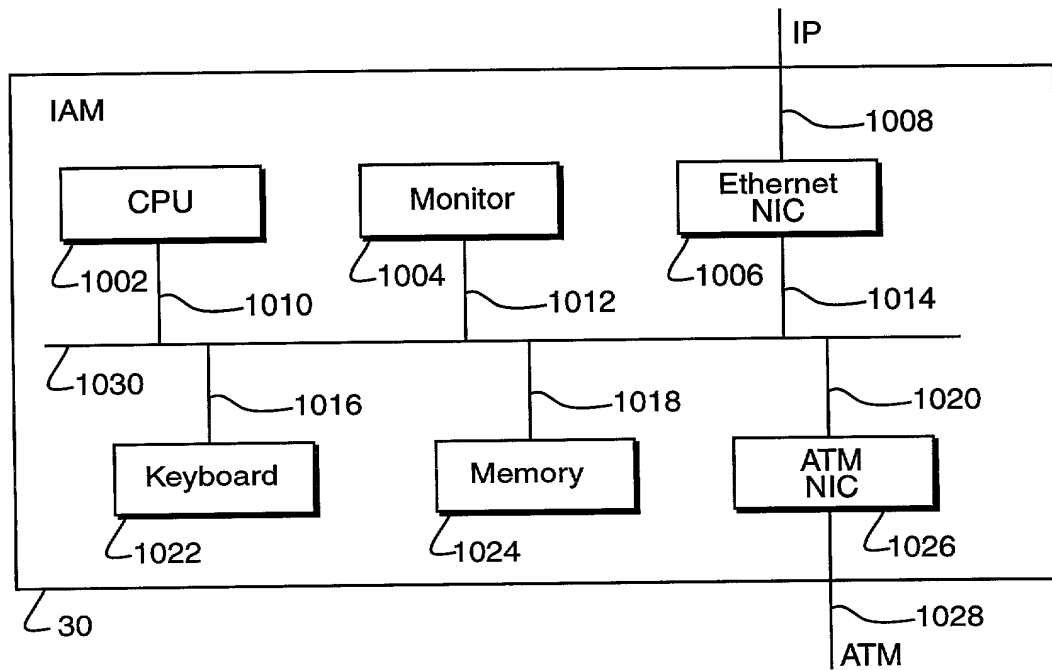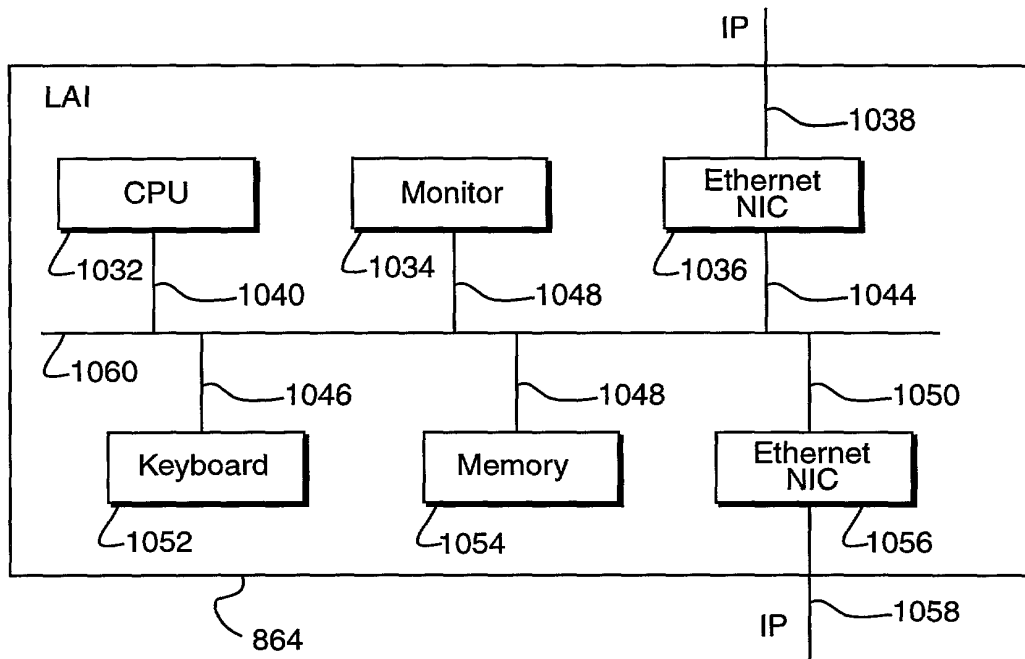CONTENT INSERTION TRIGGERS 871
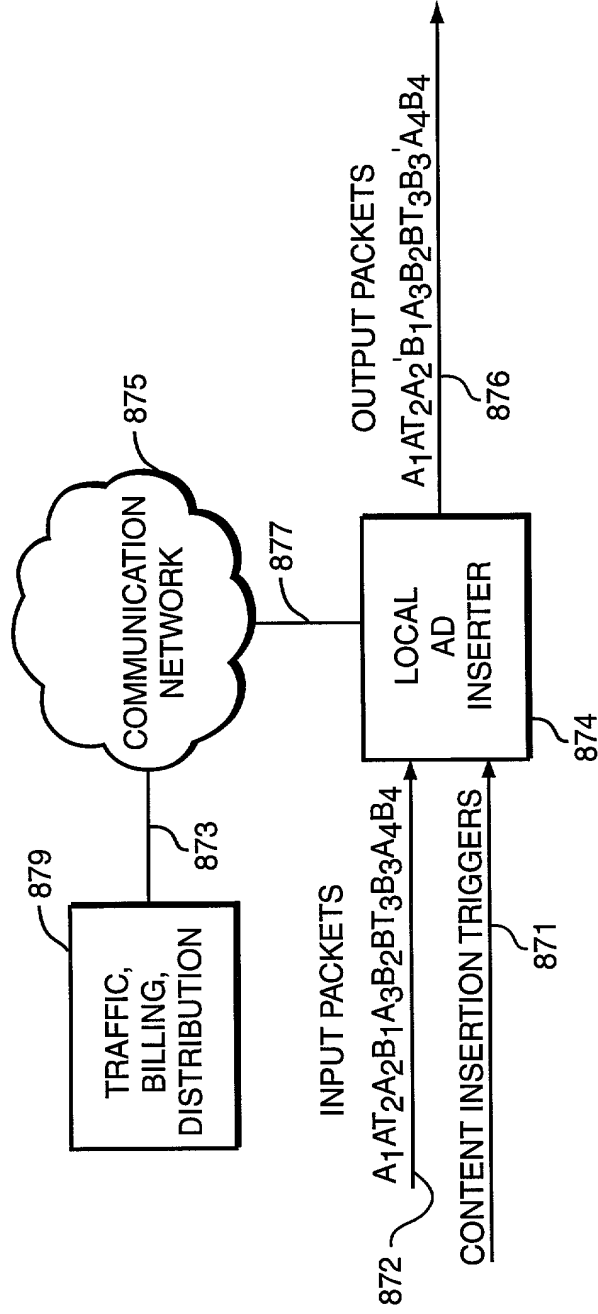
Fig. 8

Example Local Ad Insertion
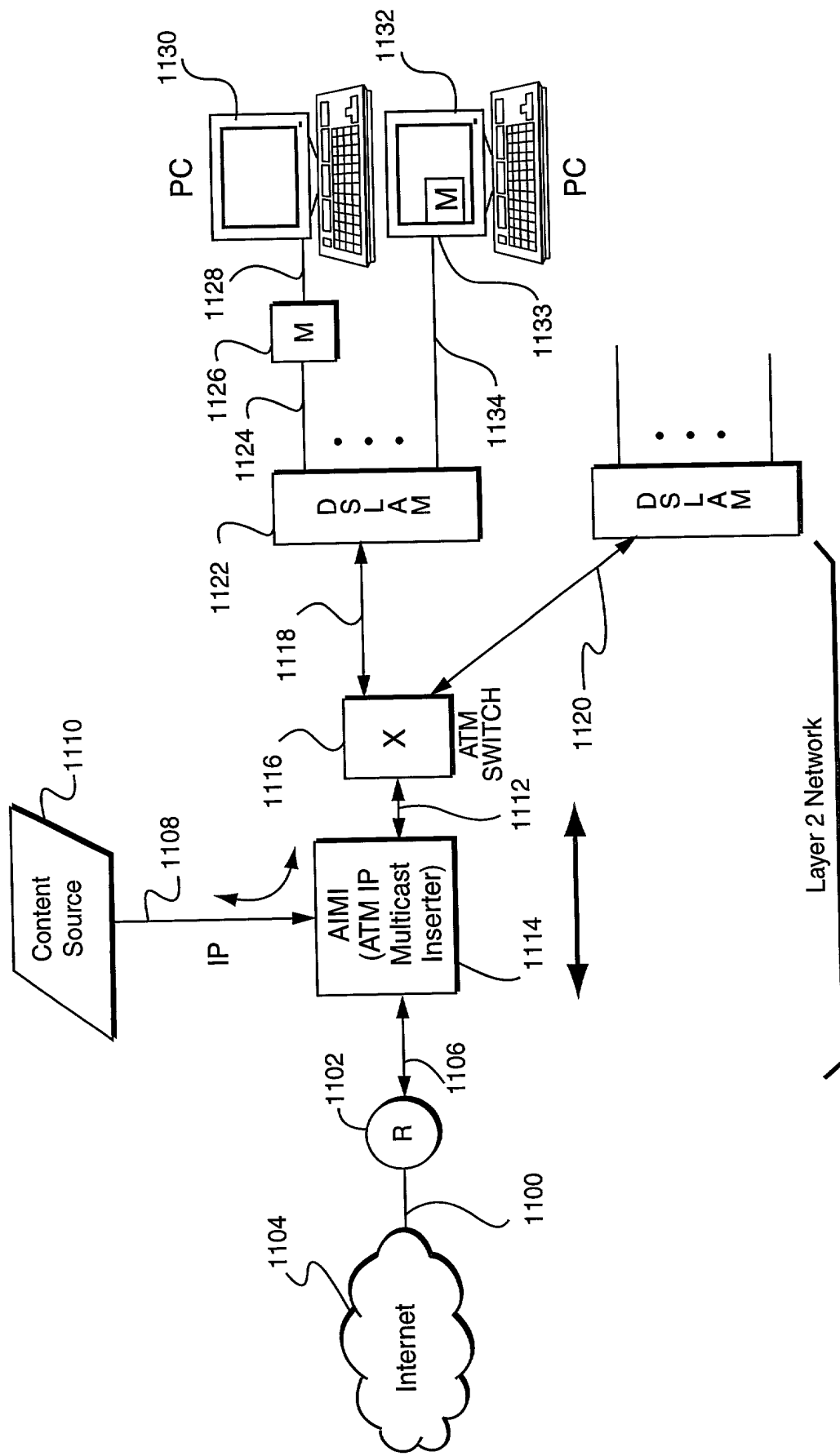
Fig. 9

Example Personal Ad Insertion Arrangement

Fig. 10

Example IAM Internal Architecture

Fig. 11

Example LAI Internal Architecture

Fig. 12

Example Direct Multicast Content Injection into ATM Network

MULTICAST
CONTENT
SOURCE

1308

Ethernet
NIC

1310

1312

INTERNET/
NETWORK

1304

ATM
NIC

1306

ATM
NIC

1318

1320

DSLAM

Monitor
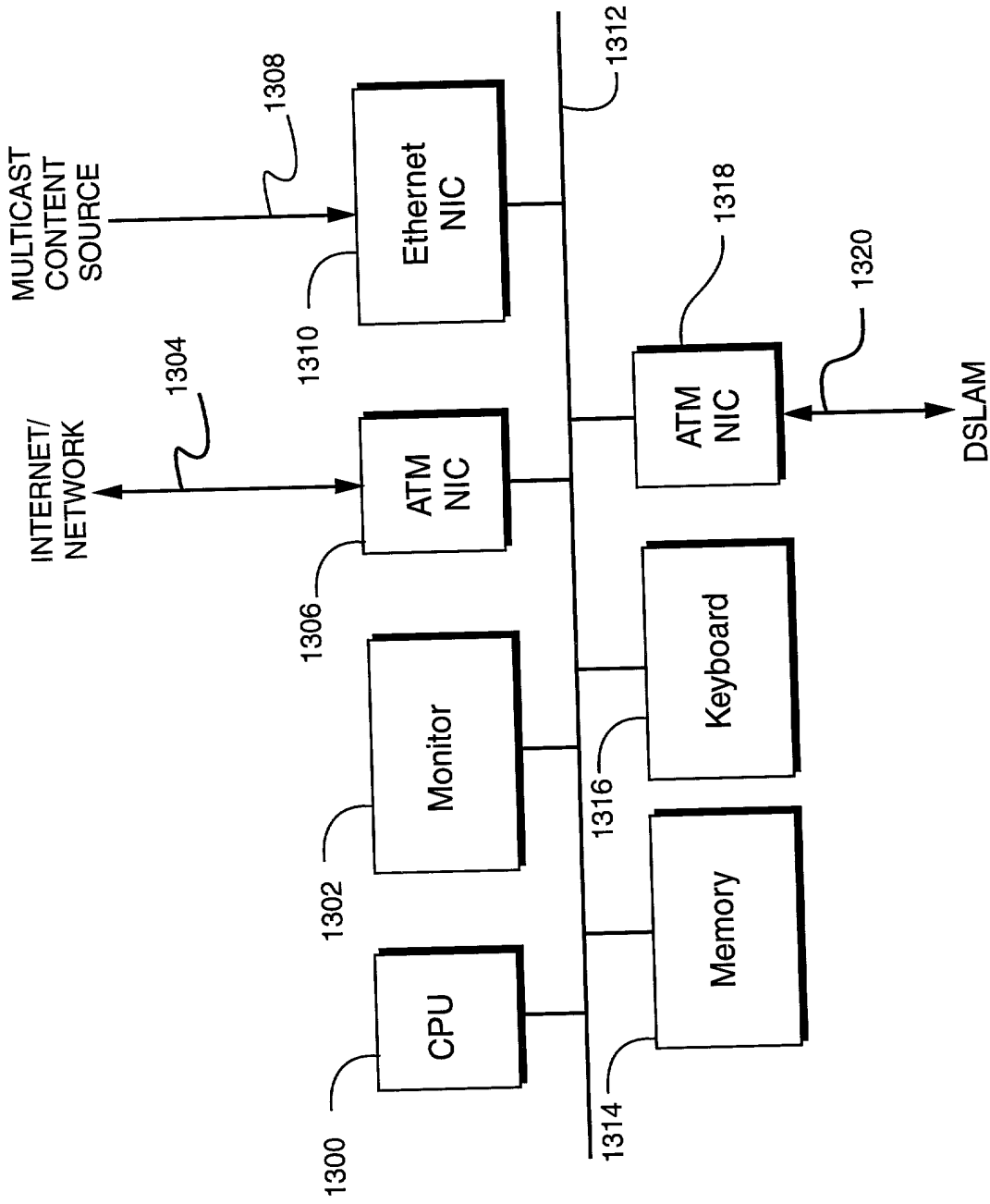
Keyboard

1316

1302

CPU

1300

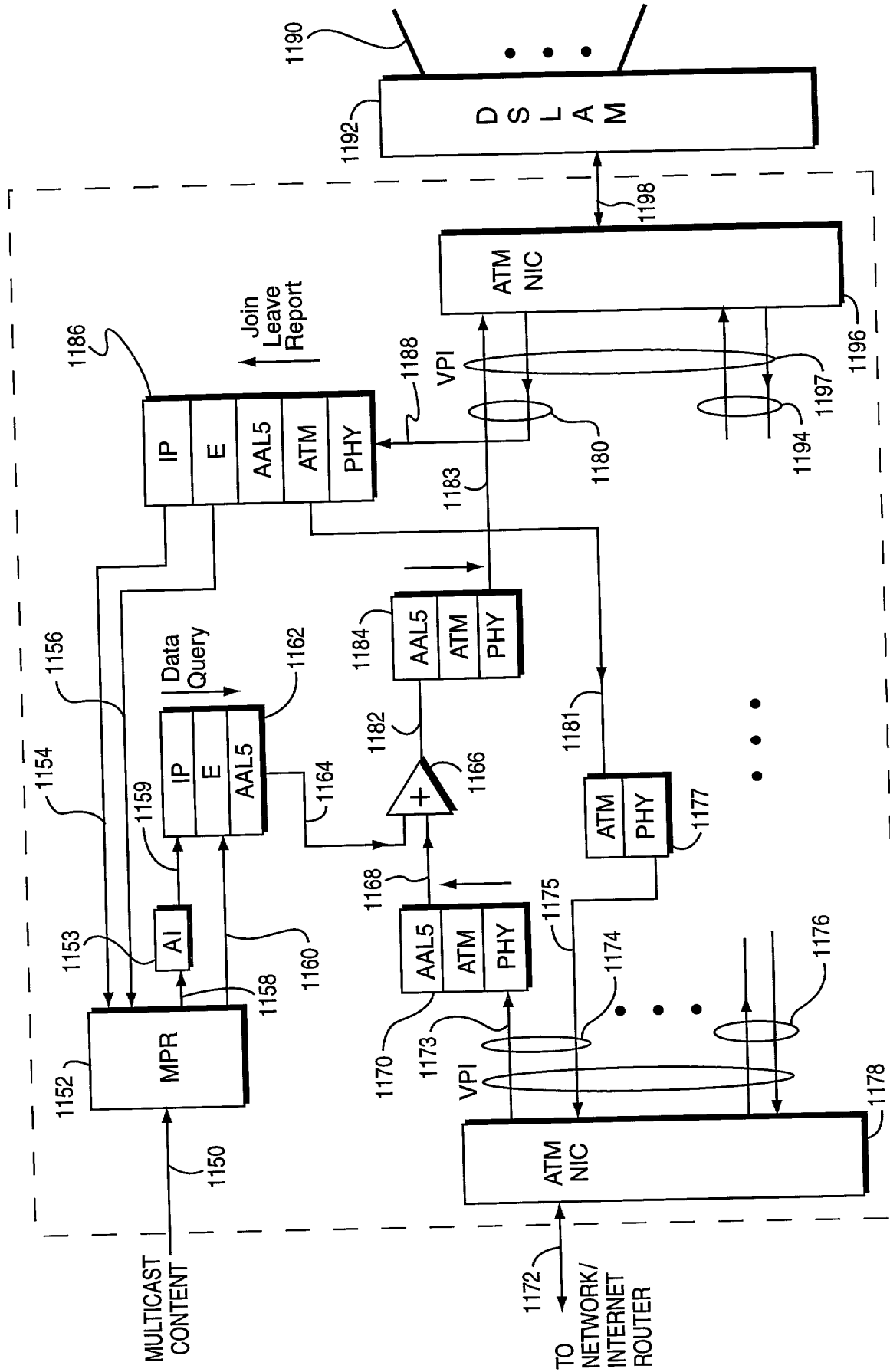Memory

1314

Fig. 13   Example AIMI Hardware Configuration

Fig. 14 Example AIMI Internal Processing Architecture